JPRS 73985

9 August 1979

East Europe Report

SCIENTIFIC AFFAIRS

No. 638

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50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. JPRS 73985	2.	3. Recipient's Accession No.
4. Title and Subtitle EAST EUROPE REPORT: SCIENTIFIC AFFAIRS, No. 638			5. Report Date 9 August 1979
			6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No.
			11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered
			14.
15. Supplementary Notes			

16. Abstract (Limit: 200 words)

This serial report contains press and radio coverage on the development of and progress in the various theoretical and applied scientific disciplines and technical fields; and the administration, structure, personnel, and research plans of leading East European scientific organizations and institutions, particularly the academies of sciences.

17. Document Analysis a. Descriptors

x International Affairs
__ Albania
__ Bulgaria
__ Czechoslovakia
x German Democratic Republic
x Hungary
x Poland
__ Romania
x Yugoslavia

Scientific Societies
Research Management
Organizations
Research

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group 5B

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Unlimited Availability Sold by NTIS Springfield, Virginia 22161	UNCLASSIFIED	45
	20. Security Class (This Page) UNCLASSIFIED	22. Price

(See ANSI-Z39.18)

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

JPRS 73985

9 August 1979

EAST EUROPE REPORT

SCIENTIFIC AFFAIRS

No. 638

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POLAND

YUGOSLAVIA

OPTICAL WORKS CONTRIBUTES IMPORTANT SCIENTIFIC HARDWARE TO CEMA

Budapest FIGYELO in Hungarian 11 Jul 79 p 7

[Text] Products of MOM [Hungarian Optical Works] developed in the course of CEMA cooperation represent a high degree of modern technology. MOM developed its broadest cooperation with its CEMA partners among interested enterprises and institutions, especially those in the Soviet Union.

Within the framework of multilateral cooperation, MOM coordinates development and production of image-transmitting and light-conducting fiber optics products. It also plays a role in the evolution and implementation of the Unified Computer Technology System and the Minicomputer system. Cooperation is now taking form in the field of laser technology. In this field, MOM has undertaken the development of helium-neon lasers as well as the so-called beam expanders. As the result of work in progress with Soviet partners over about 6 years, a modern device of organization technology, the ORGTEXT, which is an automatic text writer came into being. It is now being updated. This versatile piece of equipment relieves administrative workers of a great deal of routine work. It automatically inserts stereotype portions of text into business correspondence. When text needs changing, only the new words or phrases need be fed into the device which make the correction automatically and even stores both original and corrected text if necessary. It also keeps a precise record of supplies in small stockrooms, prepares inventories, keeps track of what jobs must be performed and gives warning of approaching deadlines.

MOM has been working with the Soviet main authority for geodesy and mapping for more than 10 years. Most recently it fabricated, on the basis of Soviet documentation, a device known as the STEREOGRAPH worth about 1 million forints, which is used to interpret aerial photographs. The first two models were completed last year. Additional interpreting equipment is being fabricated this year and a more advanced model is being developed at the same time.

The STEREOGRAPH takes a reading, makes a fix from aerial photographs taken by the two lenses of the camera on the plane and immediately pinpoints the location of the objects photographed with its automatic recording device on a map, showing their location, actual distance and differences in elevation.

The number of firms which make ultracentrifuges can be counted on the fingers of one hand. Three of these operate in socialist countries. The Hungarian enterprise has evolved systematic work distribution in the production of components.

MOM has been collaborating with the Soviet VNIIMP for about 7 years. The Hungarian firm makes teleautographic light-conducting optical fibers and ships them for use in Soviet endoscopes. MOM's optical fibers hold an outstanding position in the world insofar as quality is concerned.

Hungary has been cooperation with its Soviet partner for a decade in developing the most up-to-date bubble and holographic memories. The bubble memory stores several million units or bit and makes access to them possible with exceptional speed. Although the holographic memory is less rapid, its capacity is a thousand, possibly 1 million, times greater.

MOM specialists collaborate with their colleagues including those at the Zeiss works in the GDR in many fields.

The LEUKOMOM, one of the world's most modern instruments for measuring whiteness, is the result of such cooperation. The instrument can present the degree of whiteness numerically, thus making possible a perfect match or revealing shades of difference. The instrument can be used not only in the textile industry but also in the production of dyes, the pharmaceutical industry, the cosmetic industry and even in the vehicle industry.

MOM has established mutually advantageous ad hoc cooperation with enterprises in other socialist countries as well. The production technology of MOM and PZO of Poland are similar in a number of areas, for example, in the use of laser technology and fiber optics. It is largely because of this similarity that close contact has been established in the course of which the respective firms exchange experiences regularly, notify one another of results and problems.

CSO: 2502

HEART SURGERY PROGRESS, OUTLOOK REPORTED

East Berlin PRESSE-INFORMATIONEN in German No 62, 31 May 79 p 4-5

[Article by Prof Harry Warnke, MD, chairman, Study Group for Heart Surgery in the GDR: "Progress in Heart Surgery"]

[Text] For a number of years, it has been possible in the GDR to correct almost all congenital and acquired heart defects by conducting operations. This begins with the correction of congenital heart defects in infancy and childhood and goes all the way up to heart operations in the prime of life. In the mid-1970's, as a result of development of the GDR's own heart-lung machine, operations on infants up to a minimum weight of around 5,000 grams became possible. All operations of this kind are conducted with a GDR-made device constructed in accordance with the mechanical assembly technique.

To an increasing extent, heart defects can be surgically handled; this particularly applies to diseases of the coronary vessels. Also, heart valve surgery has developed further in recent years and artificial heart valves are being implanted to an increasing extent.

The GDR occupies a leading international position, with regard to quantity and quality, in the handling of disturbances of heart rhythm with the so-called cardiac pacemaker. In recent years domestic production of pacemakers has been successful, thus saving valuable foreign exchange. Special devices for particular forms of such impulse conduction defects are still being imported.

Five High-Capacity Centers

In recent years cardiac surgical interventions--this is also true internationally--have constantly increased. This connected mainly with expanded diagnostic possibilities and with scientific-technical progress. Because of the necessarily high technical cost, there is generally a tendency toward concentration on only a few high-capacity centers. Above all, they must be in a position to conduct operations with the heart and lung machine for various aspects of illness. There are five such cardiac centers in the GDR.

Four are at the universities of Berlin, Leipzig, Halle and Rostock. The fifth center, at the Bad Berka central clinic, is directly subordinate to the GDR Ministry of Health. In the last few years this has developed into an establishment capable of high performance. The precondition for excellent-quality work in these centers is the interdisciplinary connection of heart surgery with cardiological diagnosis and therapy, as well as with anesthesia and intensive therapy.

At present the GDR is not in a position to make all the necessary interventions while utilizing the heart-lung machine to a full degree. By 1980 the number of operations utilizing the heart-lung machine is expected to reach 1,000 a year. Considering present development, this number is realistic.

Specialized Hospitals Are To Be Included

A decided improvement in the medical care of the population has been achieved now that pacemakers can be inserted in cardiac centers and some specialized hospitals. In the future as well, perfected operation procedures which do not require any very great, highly specialized technical expenditures are supposed to be put into use, in the interest of the population, in still other surgical clinics.

Requirements for cardiac surgery will further increase in coming years. Through medical checkup alone, congenital and acquired heart defects are being recognized to an increasingly greater extent. Also, with the increasing number of births, a further increase in cardiac surgical interventions has to be expected. Experience shows that the percentage of children who come into the world with heart defects remains about constant.

The area of research involves further improvement in cardiac surgical intervention for the purpose of preserving the organ, particularly in cases of diseases of the coronary vessels. This involves prompt recognition and handling, in order to avoid irreversible damage to the heart-attack-prone patient. There are methods in the development stage and in practical use which guarantee extensive protection of the heart muscle. Through them and through utilization of the heart-lung machine, today it is possible, in cases of complicated congenital heart defects, to undertake a full correction during infancy and childhood, and to dispense with the previously common so-called two-stage procedure. Previously, only a partial correction was possible for infants, and it was then followed in childhood by the complete correction of the heart defect.

Another focal point of research is the experimental testing of various procedures for relieving stress on the heart and for occasional assistance to it, for example after a difficult operation. It is not possible to tell to what extent heart transplantation or insertion of artificial hearts will play a role in the next decade and afterwards. The GDR is utilizing animals for work on transplantation problems involving preservation and operation techniques.

GDR research on medical-technical developments is mainly oriented toward the possibilities of the GDR and of the other socialist countries. This depends on production of an increasing number of important devices and consumption materials within the CEMA countries. Recently progress has also been made in this area.

Work on heart surgery makes great demands on all involved. It ranges from complicated operations, some longlasting, up to intensive postoperative care.

CSO: 2302

GERMAN DEMOCRATIC REPUBLIC

BRIEFS

NEW NAME FOR ASTRONAUTICAL SOCIETY--The GDR Astronautical Society (Astronautische Gesellschaft der DDR) has been renamed the GDR Space Exploration and Travel Society (Gesellschaft fuer Weltraumforschung und Raumfahrt der DDR). On the occasion of the name change, a new presidium was elected at the membership meeting. It will be headed by Prof Dr Hans-Joachim Fischer, director, Central Electronics Institute, GDR Academy of Sciences, and chairman, Scientific Space Flight System Section, International Astronautical Federation. The society's former president, Prof Dr Johannes Hoppe, and the GDR's first cosmonaut, Colonel Siegfried Jaehn, became honorary members of the presidium, which also has four vice presidents and ten members. [Text] [Bonn INFORMATIONEN in German No 10, Jun 79 p 7]

CSO: 2302

ACTIVITY OF ACADEMY DEPARTMENT OF CHEMICAL SCIENCES REPORTED

Budapest KEMIAI KOZLEMENYEK in Hungarian No 1-2, 1979 pp 1-17

[Article by Mihaly Beck, Department Chairman: "Report on the Activities of the Chemical Sciences Department"*]

[Text]

Contents

1. Introduction

Already in 1831, when the Hungarian Academy of Sciences still considered its chief goal to be the cultivation of linguistic, historical and literary knowledge, it already had as a member a chemist in the person of Janos Schuster.

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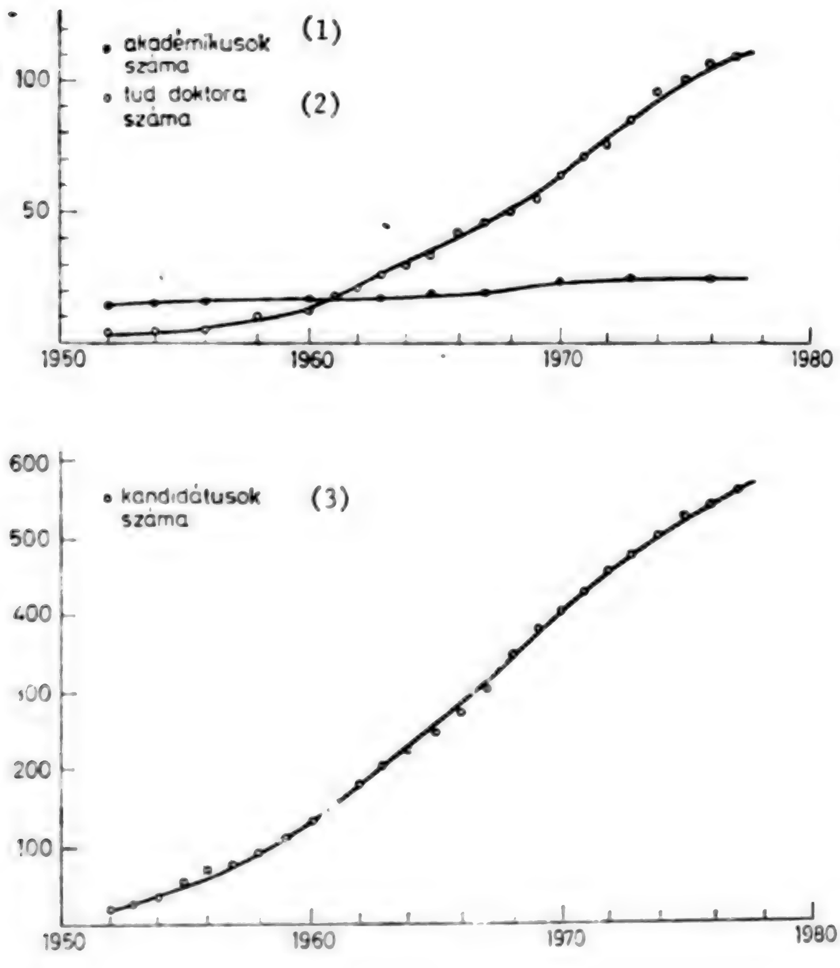
*The report was discussed and accepted by the Presidium of the Hungarian Academy of Sciences [MTA] at its meeting on 31 January 1978.

But until the liberation the Academy as a body did not play a significant role in the life of the country's chemistry community, or rather, was restricted to the presentation of more significant papers. Fundamental changes were brought about by the Academy's reorganization and by the 1951 general meeting, which decided on the formation of an independent chemical Department. At this time the 7th Department had 7 regular and 9 corresponding members. The changes in the Department's membership size, which came about during the last quarter century are reflected in the first inset. Currently, the Department has 13 regular, 12 corresponding, 12 honorary and 9 consulting members. It goes without saying that today, the Chemical Sciences Department as a body, and individual Department members, through the functions deriving from their assignments have a direct or indirect role in all of the country's chemistry related matters. This report, however, primarily strives to analyze the direct role of the Chemical Department as a body in the country's chemical research, in various levels of education and in the development of the chemical industry.

2. Structure of the Department



Key
(1) number of academicians
(2) number of doctors of science
(3) number of candidates

Graph 1. The numerical configuration of those qualified in the Department

The activities of the Department take place, in essence, in departmental committee and working committee meetings.

2.1 We hold meetings on 8-10 occasions during the year. Inaugural addresses, discussions of studies analyzing individual problems of broader scientific scope, discussions of scientific policy matters, as well as matters requiring the so-called Department opinion (qualification cases, university teaching and lecturing appointments, as well as opinions on applications for directorships and assistant directorships of research institutes) appear on the agendas of Department meetings.

Inaugural addresses meant important affairs to the Hungarian chemical community. The Banquet Hall often proved to be too small to accomodate the audience. Attendance of Department members at closed Department meetings is close to 100 percent. We are planning to have introduced at the Department meetings the most worthwhile reports on original research which young researchers presented at committee, or rather working committee meetings. This would have an incentive effect on young candidates and not yet qualified researchers.

2.2 The Department has 6 scientific committees:

The Analytical Chemistry Committee

The Physical and Inorganic Chemistry Committee

The Macromolecular Chemistry Committee

The Technical Chemistry Committee

The Radiochemistry Committee

The Organic Chemistry Committee

We have a joint committee, the Food Science Composite Committee, with the Agricultural Science Department.

We have a joint committee, The Solid Body Physics Composite Committee, together with the Mathematical and Physics Sciences and the Technical Sciences Departments.

A joint committee together with the 2nd, 3rd, 4th and 10th Departments is the Science and Technology History Composite Committee.

In the following we will only discuss in more detail the work of the 6 committees and the Food Science Composite Committee.

While generally committee meetings are held 2-3 times a year, there are some committees which meet more often. At committee meetings in part original scientific presentations and their discussions, and in part analyses of working committee activities are conducted. Thus, our committees can be

considered equally as scientific forums and as workshops of science organization. Committee meetings take place in research places, and often--in the case of the Technical Chemistry Committee, almost always--in chemical industry plants.

2.3 Altogether, the 7 committees have 37 operating working committees. A listing of the working committees, the number and distribution of their members are shown in inset 2. The working committees are occupied almost exclusively with the discussion of original research presentations. While they only hold meetings 2-3 times a year, one of these meetings, generally held in the country, is usually 2 days long. During these meetings, many of those concerned with the subject being discussed are invited to participate. In the past, evaluations of scientific reports and plans were also conducted at working committee meetings. The practice of conducting preliminary discussion of candidate theses at working committee meetings, which is nearly a decade old, is becoming almost the general rule. In fact, although this is not prescribed by the regulations, even dissertations submitted for the doctor of science degree are presented at preliminary working committee meetings by their authors. At the working committee meetings, the scientific discussions are generally lively, high level, informal and honest. Their atmosphere is not comparable to the somnolence and disinterest of the majority of the so-called defense discussions.

Some of the presentations conducted at committee and working committee meetings, at the recommendation of the committee, or rather, working committee chairmen are published in KEMIAI KOZLEMENYEK.

On many occasions there are opportunities for presentations by foreign speakers, primarily at working committee, but also at committee meetings. The importance of this is not only that an outstanding representative of a particular field discusses his work, but also that it presents an opportunity for young researchers, who have not had an opportunity to go abroad, to establish personal contacts. We believe our working committee network can be considered complete with the 37 working committees. The institution of additional committees would lead to the dispersal of our forces.

We are also involved with the examination of the feasibility of possible reductions. There already is an example of this. Following the 1976 general meeting, while our working committee network broadened overall, two working committees were combined.

The initiative of two working committees occasionally holding joint meetings for the purpose of many sided discussion of borderline problems has proven to be sound. Such joint meetings took place, for example, between the Reactor Kinetics and Catalysis and the Coordinated Chemical working committees. In fact, there are even examples of working committees not belonging to the same committee holding joint meetings. These resulted in numerous collaborations which otherwise would hardly have taken place. In this area, however, there is still much to be done, because work of this sort is still, to a large extent, random and based on individual initiative. As the example of the Radiochemistry and Analytic Chemistry committees' working committees illustrate, it would be advisable to conduct these more systematically.

Certain working committees are in contact with the appropriate committees of the Association of Hungarian Chemists, and have come to conduct joint affairs on numerous occasions. However, here also there is need for a greater degree of coordination.

2.4 In addition to the activities indicated in the preceding, there is, at times, opportunity for meetings of a different nature. Thus, with the participation of the chairmen and secretaries of most committees and working committees, we held a meeting for the coordination of committee and working committee activities. More important than this organizational character discussion is the just as unusual departmental conference which we convene, after suitable preparation, to discuss individual important problems. We shall return to the description of the Szazhalombatta aromatics conference when we discuss our industrial relations.

Although we cannot be totally satisfied with the relationships among certain committees, or rather working committees, it can be ascertained that these often rely upon each other's work. As an example, we are noting that the Solid Body Composite Committee, at one of its meetings, took up the necessity of examining certain problems of the country's refined chemicals manufacturing. Shortly thereafter, the Analytical Chemistry Committee organized the Refined Chemistry Conference, which examined this important problem from the perspectives of foreign trade organs, consumers (research, industry) and analytical chemistry.

3. Status of Chemical Sciences

3.1 The chemical industry had and still has a determinant role in the status of chemical sciences. While before the liberation, research was conducted exclusively in university institutes, or rather in the research laboratories of one or two large plants (Egyesult Izzo, Chinoin, Kobanyai Gyogyszerarugyar), today, as a result of extremely rapid development even within the industry, the research basis has considerably broadened. Today, in the Department's province, 4 academic research institutes are operating. Parallel with these in quantity and quality, departmental research has developed significantly. Departmental research is reinforced by the Academy through 6 institute research groups, or rather, teams. Numerous chemical research institutes are operating under the supervision of other authorities, primarily that of the Heavy Industry Ministry. We attribute quite a great importance in our researches to emphasized themes, such as research in biologically active chemicals and the petrochemical goal program, which, although under the aegis of [MTA] Hungarian Academy of Sciences, are supported to the fullest by the Department. In the Department's estimation, within the biologically active chemicals research, especially in the pharmaceuticals and plant protection industries, and in the manufacture of chemical intermediaries, that is in the petrochemical industry, scientific results are realizable in a relatively short production time, inasmuch as we have the most balanced material and intellectual bases in these areas.

Naturally, the further cultivation of those research areas in which the country has research traditions and well-known schools is desirable. The initiation of new fields, which would be required for our coming abreast of international scientific life are also desirable. We shall enumerate these in their basic points, not necessarily entirely, in section 3.2.

3.2 Numbers 1-2 of volume 47 of KEMIAI KOZLEMENYEK provides a perspective of the current status of chemical research. It is apparent from the more than 300 page volume that intensive and successful research work is being conducted in most areas, and that numerous important, internationally acknowledged and state award recognized accomplishments have come forth. However, it is also ascertainable that in the recent past there were no discoveries of striking significance.

Because of the supplements to this volume, it is not necessary to relate the accomplishments in the various fields in this report. However, several general conclusions, without attempting completeness, seem to be in order.

3.2.1 Important analytical schools are operating in our country. Partially because of this and partially because of the apparent many sided needs for analytical research, rather intensive research is being conducted, the results of which even today enjoy international recognition. In this field, particularly significant are the various optical, electroanalytical, as well as thermo- and radioanalytical researches.

3.2.2 Because of the work of a few researchers of outstanding importance, significant accomplishments had been achieved even earlier in the field of physical chemistry. The development in this field is still in leaps and bounds. Rather extensive and successful researches are currently in progress especially in reaction kinetics and catalysis, in the equilibrium processes of solutions, in non-equilibrium thermodynamics, in materials structure and in the areas of colloids and adsorption. The potentials of electrochemistry research, which has such great traditions, have for various objective and subjective reasons been recently deplorably curtailed. It would be desirable to ensure the renewed development of these researches by removing the obstacles.

3.2.3 There was no research basis in our country for macromolecular research in the past. The development of the synthetic materials industry by itself made basic research conducted in this field necessary. This is being conducted rather successfully in several research institutes and departments. The prognosticating study prepared by the Macromolecular Chemistry Committee, the recommendations of which, approved by the presidium, and significantly supported by NIM [Ministry of Heavy Industry], had a significant role in the continued development of this field.

3.2.4 We had technological accomplishments of international significance before the liberation also, but the cultivation of chemical technology as an independent science began and gained new impetus only after the liberation with the institution of MTA's Technical Chemistry Institute. The

intensification of technical chemical research is a necessary result of the unusual development of the chemical industry, which significantly surpassed average industrial development, and which had a fruitful effect on the agricultural and foodstuffs chemistry researches which otherwise tended to look back on traditions.

3.2.5 Although the discovery of isotope indication attaches to the name of Gyorgy Hevesy, and there was research in this sort of direction on a limited scale before the liberation, only after the fifties did the country's radiochemical research become significant in this area. It is all the more noteworthy that these types of researches are being conducted currently not only in academic institutions, primarily in the Izotop Intezet, but also in numerous departments.

3.2.6 Significant accomplishments emerged in organic chemistry before the liberation. It is sufficient to mention the Zempler and Zechmeister schools in this regard. Since the liberation though, exceptionally wide ranging research work has been conducted in university departments and research institutes. The researches were often directed towards the preparation of new compounds potentially usable as pharmaceuticals. Especially intensive and successful research work is in progress in the areas of peptides, alkaloids and other heterocyclic compounds, as well as in carbohydrates and steroids. We may happily acknowledge that the research is sufficiently flexible to be able to regroup towards appropriate international trends (we are here referring to the initiation of research in prostaglandin, juvenile hormones and liquid-phase photochemicals which have emerged in recent years).

3.2.7 Food science researches have also significantly developed in recent years. The Food Science Composite Committee holds 10 meetings annually, all arousing great interest. Specialization has made progress in this area also. This committee was followed into the working committee network by the institution of the Lipid and Food Protein Chemistry Working Committee.

3.3 Hungarian chemical researches are in multifaceted and animated connection with international researches. We can impartially state that in numerous fields the researchers and researches have entered into the international scientific bloodstream. In this connection we shall mention that 6 of the Departments' members are honorary members of other academies, and that 15 members participate in the editorial committees of 32 international periodicals.

One of the signs of international respect for Hungarian research is that numerous important international scientific conferences are held in Hungary. The committees, or rather, the working committees always participate in the preparatory work.

4. Cadre Status

A characteristic of our science field is that, compared to the population of the Department, the research basis is rather large, and that many among the researchers are qualified. Currently there are 565 candidates and 108 doctors

of science in our field. The breakdown of the number of the scientifically qualified is likewise revealed by the first figure. It does not follow from the data, however, that we can with justification speak of inflation in our field, since there has been less growth recently than there was earlier. Since 1969, no one among those at the candidate level has attained the doctorate degree. The basis for the decreased valuation of scientific degrees is that occasionally, according to the concensus of scientific evaluation, some undeservedly attained qualification. The various committees and working committees, primarily the Physical Chemistry and the Inorganic Chemistry Committees regularly evaluate the qualification status of their narrower areas. On such occasions they call attention, even on a personal basis, to the timeliness of securing the degree. There are altogether 945 members, 80 percent of whom are qualified, in the committees and working committees. From the place of employment perspective, 20 percent are in academic positions, 43 percent work in departments, and 37 percent work in other, mostly industrial employment. (12 percent of the committee membership are women.) It should be noted that because of multiple memberships there are not 945 but close to 700 people working. The number of relatively young members has significantly increased recently. It appears that replacements on all levels can be considered assured. Looking to the future, our task is to success in involving this large, nearly 700 member apparatus to an even greater measure in the solution of our actual problems.

5. The Department's Domestic Relations

5.1 Relations with other departments. While our relations with other departments can be said to be good on the whole, since we always readily participated in the joint discussion of various problems and experienced a similar readiness from the other departments, we cannot be satisfied with the frequency of joint endeavors. Our relations with the departments are many sided: on the one hand, there are composite committees, members of whom belong to several departments; on the other hand, we look for cooperation in connection with individual tasks. Recently our relations with the Agricultural Sciences and the Biological Sciences Departments have become more active in regard to problems of plant protection agent research, and also with the Technical Sciences Department in regard to chemical electricity sources. We have previously mentioned our relationship with the Mathematical and Physical Sciences Department.

5.2 Relationship with Administrative Agencies. We can happily state that our relationship with Administration, more specifically with the Department of Natural Sciences, is untroubled, and hopefully will progress more and more towards work and discussion of problems of content.

5.3 Our relationship with the Scientific Qualification Committee is steady and smooth. In the interest of raising the level of the doctorate degrees and of the evaluative process for their attainment, in concert with TMB [Scientific Evaluation Committee], we decided that in the future a short but evaluative report will appear in KEMIAI KOZLEMENYEK concerning the discussion of doctoral dissertations.

In the verdict on doctoral applications there is rarely a difference between the Department's opinion and the TMB's decision. The TMB has always sought the Department's view and has taken it into consideration in inviting aspirants' theme applications. Similarly, the makeup of the technical committee concerned takes place with the Department's opinion in mind.

5.4 Our relationships with the various ministries can be said to be generally good. Among our consulting members is one highly positioned colleague each from NIM [Ministry of Heavy Industry] and from OM [Ministry of Education].

At NIM's request we organized the rather successful Aromatics Conference, the recommendations of which were discussed by the Department and forwarded to the ministry. According to feedback from the ministry, the Conference's suggestions will be estensively utilized in further development and industry policy measures. Also at NIM's request, we dealt with problems of plant protecting agent manufacturing, and are making a recommendation for the convocation of an inter-division composite committee.

While our relations with OM are normal, on the organization level they are currently restricted to expressions of opinion on teaching and lecturing applications, as well as to tolerably formal evaluations of mid-range plans and research institute reports. In concordance with the ministry, we are planning to hold regular Department meetings at individual universities so that the Department will have closer observation and a better grasp of their chemistry researches and instruction.

The Agricultural Sciences Department assisted in the development of our relations with MEM [Ministry of Agriculture and Food Industry]. On the basis of our discussions the two departments are planning joint studies of several important problems (examination of the potentials of cooperation between the chemical departments of agricultural and scientific universities in order to train the appropriate specialists; the study of the problem of microelements, etc.).

5.5 The most important principles of our cooperation with the National Technical Development Committee [OMFB] were established in an agreement. Moreover, this was the first agreement subsequent to the agreement made in 1972 between the Academy's presidium and the OMFB, and the first to concretize it to a given scientific area. We hope that this will significantly contribute to the intelligent utilization of the scientific assets latent in the Department and its committees, and especially to the determination and solution of research problems important from the people's economy standpoint. In many cases we had already discussed OMFB studies. The previous procedure, however, made it almost impossible to have the Department's opinion available before decision making. In the future the task of each working committee will be to prepare a study for OMFB. It should be noted, however, that this work will involve very few working committees and cannot decrease the other activities of the working committees concerned.

5.6 Our relations with the Association of Hungarian Chemists [MKE] are good. Our chairman of MKE is the consulting member of the Department, several academicians are active in the Joint Presidium, academicians are chiefs of several joint committees, and MKE has sought and considered the Department's views often in important matters.

5.7 Industrial Relations. The Department is deeply involved with the most important research problems in the sphere of the goal programs and chief directions of the National Long Range Scientific Research Plan. As a result of its activities, the level of research is steadily rising in research institutes, not only within but outside the Academy. Colleagues from industrial research institutes and plants are working in significant numbers--37 percent of the total--in the committees and working committees. The frequent holding of committee and working committee meetings in plants serves to develop industrial connections. The Szazhalombatta conference, but our other experiences also indicate that our industrial colleagues are dealing with various scientific problems with great expertise, and at the same time, that they need the support which they can receive from the working committees and the Academy. At the same time the Department naturally needs the industry's interest in scientific work, and greatly appreciates the latter's desire to depend upon the Department for support in its problem solving. The unusually great development in chemical industry can be characterized by the production value's increase of nearly fifty fold during the last 25 years. The Department played a significant role in the development of the scientific basis for this advance. The Department continues to require that its views be relied upon in the scientific matters of chemical industry development. Through its committees the Department is able to direct the country's research basis in the desired direction. Since its foundation, the Department has busied itself with the needs of the people's economy. Occasionally it has even been accused of practicism within the Academy. Of course, the direct relation between the Academy and industry can primarily appear in the relation between academic measures and industry. The Department's position is fairly unanimous in the view that research, including basic research, should consider the problems and requirements which practice has encountered. The whole development of chemistry exemplifies the significance of this creative relation.

It is a mistake to oppose practice and scientific research. The decisive question is the quality of the research results. High level researches are of practical interest, and sooner or later become useful. Scientific examination of practical problems, moreover, has a productive effect on basic research. In industrial research what appears more dangerous is that some researchers, or rather, research places are working in the direction of least resistance, with less care, and are motivated in their endeavors not by the interests of the people's economy but by the institutions' financial interests. Without the KK (KMB) system neither research institutes nor departments could work successfully. Without the income flowing through these channels it would indeed be impossible to maintain modern research, or rather, education. In essence, the contracted work has proven to be successful. The majority of the commissions are long range and thus result in research which can be well planned.

Here we shall mention that in regard to the success of researches with a practical goal, we can rely somewhat on the number of patents put to practical use and to the number of reports of discovery. In the last 10 years there were 109 reports of discovery by academic institutions and research groups with academic support. Of these 91 received patents. Of the patents, 23 were for internal use and 32 were utilized in production through licensing (35 percent). This is considerably greater than the national average (20-25 percent), and can be said to be quite good even in the Academy. The license fee paid was 10.5 million forints, which is equivalent to approximately 200 million forints in production value. These data, however, reflect considerably less patent activity, because the majority of the patents of academicians, or rather, academic status workers is from the beginning in the possession of associate institutes, or rather, enterprises. This is increasingly valid for patents which have been put to use. [Such, for example, are the Alkaloid Chemistry Department Research Group's Vinkamin synthesis implemented in the Kobanya Pharmaceuticals factory (8 patents; the 1977 production value was approximately 60 million forints), and the 250 million forints production value achieved from instrument manufacturing by the Research Group of the Technical Analytical Chemistry Department.]

Table I

Personnel composition of committees and working committees

Committee	Number of members	Membership distribution according to place of employment: Research place: Academic	University	Industry	Membership distribution according to qualifications: Academician	Doctor of Science	Candidate	Not qualified
1. Analytical Chemistry Committee	24	2	19	3	2	7	15	-
Automatic Analysis Working Com.	10	4	3	3	-	2	5	3
Electroanalytics Working Com.	22	4	5	13	-	3	12	7
Chromatographics Working Com.	23	3	8	12	-	3	8	12
Radioanalytics Working Com.	21	7	9	5	-	1	13	7
Spectrochemical Working Com.	21	2	13	6	-	4	14	3
Organic and Pharmaceutical Analysis Working Com.	29	2	15	12	-	5	20	4
Thermoanalytics Working Com.	16	4	6	6	1	2	13	1
2. Physical and Inorganic Chemistry Committee	23	8	14	1	7	14	2	-
Material and Molecular Structure Working Committee	17	8	7	2	-	7	8	2
Electrochemistry Working Com.	20	2	12	6	-	8	9	3
Colloid Chemistry Working Com.	31	3	16	12	1	7	16	7
Coordinated Chemistry Working Com.	21	3	16	2	1	7	13	-
Reactor Kinetics and Catalysis Working Committee	20	9	7	4	5	5	8	2
Solid Body Chemistry Working Com.	25	9	6	10	1	6	11	7
Covalent Inorganic Compounds Working Committee	20	7	13	-	1	2	14	3
3. Macromolecular Chemistry Committee	17	3	6	8	3	7	7	-
Synthetic Materials Physics Working Committee	24	2	7	15	-	1	11	12
Synthetic Materials Chemistry Working Committee	33	10	7	16	1	-	24	8
Natural Polymers Working Com.	20	2	12	6	-	7	11	2
4. Technical Chemistry Committee	32	6	14	12	7	10	9	6
Bioengineering Working Com.	30	2	11	17	3	3	14	10
Chemical Technology and Chemical Environmental Protection Working Committee	22	1	9	12	-	5	8	9
Petroleum and Petrochemicals Working Committee	19	3	4	12	1	1	13	4
Silicate Chemistry Working Com.	23	-	13	10	-	3	15	5
Chemical Industry Mechanics Working Committee	24	2	5	17	-	2	15	7
Chemical Industry Development Working Committee	30	8	14	8	1	4	19	6
Chemical Industry Technical Systems Working Committee	26	7	14	5	1	3	13	9
5. Radiochemical Committee	23	10	8	5	2	10	10	1
Isotope Utilization Working Com.	11	5	5	1	-	2	9	-
Isotope Technics Working Com.	12	4	5	3	-	1	6	5
Radiation Effects Working Com.	10	5	1	4	-	2	8	-
6. Organic Chemistry Committee	29	8	14	7	10	11	7	1
Alkaloid Chemistry Working Com.	28	1	14	13	2	4	13	9
Bioorganic Chemistry Working Com.	26	9	11	6	2	8	11	5
Theoretical Organic Chemistry Working Committee	22	10	8	4	1	8	12	1
Flavonoid Chemistry Working Com.	18	3	10	5	2	-	9	7
Heterocyclic Chemistry Working Com.	18	5	8	5	1	4	11	2
Carbohydrate Chemistry Working Com.	14	7	5	2	3	8	3	-
Peptide Chemical Working Com.	17	6	3	8	1	4	8	4
Steroid Chemical Working Com.	21	-	11	10	1	6	7	7
7. Food Science Composite Committee	27	-	7	20	2	6	16	3
Protein Chemistry Working Com.	10	-	5	5	-	2	4	4
Lipid Chemistry Working Com.	16	2	4	10	1	3	11	1

6. The Department's International Relations

The Department's direct and indirect international relations are fairly varied. In the area of invitations we have succeeded in acquiring the internationally most prominent scientists for speaking engagements in our country. A large number of the speaking engagements by foreign speakers were held at various committee and working committee meetings. Unfortunately, our invitation possibilities are scanty. Thus we are attempting on an increasing scale to have important researchers who are in Hungary at the invitation of other organizations participate in committee meetings.

On every occasion the Department circumspectly gave its views on foreign travel requests, but we must call attention to the fact that in today's exceptionally animated scientific life, when there are more than 700 scientifically qualified researchers working within our boundaries, appropriate Hungarian participation at conferences cannot be assured. Foreign exchange difficulties are affecting particularly the young researchers who can count on international experiences only with difficulty. Most recently, the monetary difficulties of foreign travel have increased farther. It would be advisable to take more care in the preparation and evaluation of reports related to foreign travel, and if feedback were received on every report.

The Department and its committees are regularly cooperating in the organization of more significant international participatory conferences and symposia. In this endeavor we are working very closely with the Association of Hungarian Chemists.

The more important of the affairs held most recently were the following:

Eranalysis II, 1975.

Colloid and Surface Chemistry Conference, 1975.

Danube Chromatographics Conference, 1976.

Selective Ion Electrodes, 1977.

Fifth Hungarian Bioflavonoid Symposium, 1977.

Preparations are now in progress for the organization of the next congress in the ISE [International Society for Electrochemistry] series, the Colometric Symposium and the IUPAC 1.4.1's subcommittee meeting.

The Department is a member of the following international scientific organizations:

The Combustion Institute,

International Society of Electrochemistry (ISE),

International Union of Pure and Applied Chemistry (IUPAC),

International Congress on Catalysis (ICC),

International Corrosion Council (ICC),

International Association on Water Pollution Research.

The Department's national committees are operating within the framework of the following organizations:

International Union of Pure and Applied Chemistry,

International Society of Electrochemistry,

The Combustion Institute.

Until recently the Hungarian national committee of the World Petroleum Congresses was under the aegis of the Department, but through the unanimous decision of all those concerned it was transferred to NIM's control. We shall remark that this was the first national committee which not only successfully participated in the linking of Hungarian specialists into the mainstream of international scientific life, but also served to develop scientific relations among the specialists oi socialist and capitalist countries. Our membership in IUPAC was renewed two decades ago. Unfortunately, for a long time there were exceptionally few elected Hungarian members of the various IUPAC committees, and we did not even always appropriately utilize the potentialities of national representative appointments. Recently, especially since the 1975 Madrid conference, the number of our elected members rose significantly, and even more importantly, Hungarian members are participating in the shaping of important IUPAC projects. In the future it would be advisable to systematically examine the appointment of national representatives to certain IUPAC committees, because this would result in our electing to committee membership national representatives who would intensely participate in committee work. This naturally postulates that there would be the means for the appointed individuals to participate at IUPAC functions. Also related to IUPAC activities is the exceptional work directed towards the regular preparation of Hungarian chemical spelling and terminology, as a result of which the relevant rules were published in three hefty volumes.

During next year one of IUPAC's working committees will, at the Academy's invitation, hold its meeting in Hungary.

The Hungarian national committees to the Combustion Institute and to the International Society of Electrochemistry are working with proper intensity. At the former's meetings, even scientific reports are presented, while the latter is currently occupied with preparations to the upcoming ISE conference.

The Department has only an indirect role in the administration of bi- and multilateral agreements, since the cooperation which goes hand in hand with these has properly been relegated to the academic research places most closely related to the subjects. Since we attach very great importance to cooperation among socialist academies in the solution of important scientific tasks, it would be proper to report on the researches thus being conducted. In this connection we should note that in the organization of scientific discussions with smaller international participation, we are more clumsy than the other socialist academies. It would be advisable to increase the possibilities of organizing restricted participation discussions, especially in the case of participation only from socialist countries.

7. Book and Periodical Publishing.

Before the liberation book publishing in chemical subjects hardly existed in Hungary. The majority of what there was was mostly limited to the book and periodical publishing activities of the Natural Sciences Association. For a quarter of a century, monographs in Hungarian and foreign languages have appeared regularly, published by the Akademiai Kiado. The "Newest Accomplishments in Chemistry" series, of which 41 volumes have appeared so far, has proven to be very successful. Many of the books have appeared in multiple editions and many languages, and most of them have received rather laudatory reviews in both domestic and foreign professional journals. Occasionally, however, unfavorable reviews were received. It is indicative of the high moral level of Akademiai Kiado that it gave an award for high critical standards to one of the authors who wrote an unfavorable reviews were received. It is indicative of the high moral level of Akademiai Kiado that it gave an award for high critical standards to one of the authors who wrote an unfavorable review of one of the works published by Akademiai Kiado. The following table provides a numerical survey of books appearing in the last few years:

	1970/72	1973/75
Monographs	16	34
Book Series	13	16
Conference Editions	7	1
Tables	2	--
Patent Nomenclature	1	--

Table 2

Books from Akademiai Kiado and foreign publishers appearing under joint publication between 1975-1977

1975

Braun T.-Gershini	Extraction Chromatography	Elsevier
Buzasne (editor)	Thermal Analysis Vol. 1-3	Heyden and Son
Dobos Farkas-	Electrochemical Tables	Elsevier
Gabor-Kallay (editors)	Topics in Flavonoid Chemistry and Biochemistry Proceedings of the Fourth Hungarian Bioflavonoid Symposium, Keszthely, 1973.	Elsevier
Hedvig P.	Experimental Quantum Chemistry	Academic Press, New York
Liptay Gy. (editor)	Atlas of Thermoanalytical Curves Vol. 4.	Heyden and Son
Marta F.-Kallo D. (editors)	Mechanisms of Hydrocarbon Reactions (Symposium; 5-7 June 1973. Siofok, Hungary).	Elsevier

Mazor L.	Analytical Chemistry of Organic Halogen Compounds	Pergamon Press
Nemeth B.	Chemical Tables	Hilger
Wolfram E. (editor)	Proceedings of the International Conference on Colloid and Surface Science (15-20 Sept. 1975. Budapest).	Elsevier

1976

Hargittai I. - Hargittai M.	The Molecular Geometries of Coordination Compounds in the Vapour Phase	Elsevier
Inczedy J.	Analytical Applications of Complex Equilibria	Ellis Horwood
Liptay Gy. (editor)	Atlas of Thermoanalytical Curves Vol. 5	Heyden and Son
Szabo - Kallo D. (editors)	Contact Catalysis I-II.	Elsevier
Szejtli J.	Saurenhydrolyse glykosidischer Bindungen. Einfluss von Struktur und Reaktionsbedingungen auf die Saurespaltung von Glykosiden, Disacchariden, Oligo- und Polysacchariden	Fachbuchverlag
Vukov K.	Physics and Chemistry of Sugar-Beet in Sugar Manufacture	Elsevier

1977

Benedek P.	Simul--ein Programm fur die mathematische Simulation von verfahrentechnischen Systemen	Akademie Verlag
Fresenius (editor)	Reviews on Analytical Chemistry presented at the Euroanalysis Conference II. held in Budapest, Hungary 25-30 August 1975.	Masson et Cie
Farkas-Gabor-Kallay (editors)	Flavonoids and Bioflavonoids Current Research Trends Proceedings of the Fifth Hungarian Bioflavonoid Symposium Matrafured, Hungary, May 25-27, 1977.	Elsevier
Gorog S.-Szasz K.	Analysis of Steroid Hormone Drugs	Elsevier
Hedvig P.	Dielectric Spectroscopy of Polymers	Adam Hilger Ltd.
Solymosi F.	Structure and Stability of Salts of Halogen Oxyacids in the Solid Phase	Wiley

The annual Department allocation is 170 folios but technical works in chemistry actually appear in more folios than that. In 1977 they appeared in almost 500 folios. (Half of these through publishers' page allocations.) The Department publishes two periodicals. KEMIAI KOZLEMENYEK appears annually in 60 folios. It carries high level summaries by domestic and foreign authors, as well as reports and speeches given at committee meetings. In addition, it published news about committee activities and more important international conferences. Book reviews and "Department News" round out the journal's material.

The Acta Chimica Hungarica is the Department's foreign language periodical, appearing annually in 108 pages. The purpose of Acta's initiation was to assure publication possibilities for significant Hungarian chemical accomplishments, and for it to be the representative chemical periodical for Hungarian chemical science. We can rightfully expect from a periodical with such a title which is published by the Hungarian Academy of Sciences that it truly represent Hungarian chemical science. Unfortunately this is not so. The causes of its failures are complex. The conception that Acta would become a large circulation periodical proved to be illusory. Authors, if they can, rather publish articles which they consider more important in better known and specialized international periodicals. (In this relation we would like to call attention to the fact that it would be advisable to review the Academy's, or rather, the ministry's decrees regulating foreign publication, since these are nearly two decades old and in that period significant changes have taken place in specialized periodical systems and in the possibilities for international publication.)

There is a deplorably long time span between the sending in of an article and its publication. Only one of its causes is the slowness of press production time. Acta's level was lowered by the unquenchable publishing desire of researchers of several developing countries, who are not even leading researchers in their own lands. Although recently in this respect, through very necessary editorial work, significant improvements have taken place, it would be advisable to investigate Acta's situation and to find a solution which would make the appearance of an Academy representative and sufficiently large circulation periodical possible.

Equally in regard to level and circulation, the situation in the case of 5 other periodicals is much more favorable. Although these are not the Department's periodicals, they are appearing under the aegis of Akademiai Kiado, and the Department, or rather, various committees have significant roles in their initiation and editorial work. These are the following:

Journal of Radioanalytical Chemistry

Radiochemical and Radioanalytical Letters

Journal of Thermoanalysis

Reaction Kinetics and Catalysis Letters

Acta Alimentaria

On the basis of "Current Comments'" evaluation, the "Journal of Radioanalytical Chemistry" can be considered the most respected and best known of the chemical periodicals published in Hungary.

8. The Department's Relation to Our Education System.

The teaching work conducted in the science area is directly influenced by the fact that a significant number of the members of our committee network is in direct contact with university teaching. Members of the Department participated in the examination of the status of university education and in the formulation of the reforms. The Department was involved with chemical engineering training. In special and standing committees, they were involved with the continuing education of various levels of specialists. There are areas where the problem of replacements can be solved only with postgraduate training. The Department concurred with the organization of this training.

Thus far the Department has been unable to appropriately influence the area of lower and midlevel chemical instruction, which are fundamentally important from the viewpoint of educating future specialists.

Since the Department considers the proper determination of the quality and quantity of specialist education and its practical application to be a matter of great significance, it has the intention of dealing with it in the near future at a special Department meeting. It will transmit its suggestions to the Presidium.

9093
CSO: 2502

INTERNATIONAL CONFERENCE ON MICROPROCESSORS SCHEDULED FOR BUDAPEST

Budapest SZAMITASTECHNIKA in Hungarian No 6, Jun 79 p 16

[Text] An international symposium on microcomputers, microprocessors and their applications will be held in Budapest from 17-19 October 1979 under the auspices of the Communications Engineering Scientific Society [HTE], the Scientific Society for Metering and Automation and the Janos Neumann Computer Science Society. The symposium is being supported by the Hungarian Academy of Sciences and the National Technical Development Committee. This is the first symposium on this field in the socialist countries.

The principle topics will be:

- Use of microcomputers and microprocessors, including software;
- Microcomputer systems and networks;
- The divided computing and processing system, its structure and hierarchy;
- Planning integrated hardware and software systems, their simulation, emulation and program languages;
- Problems related to teaching and application.

Among the speakers and their papers will be Stanislaw Budkovsky (Warsaw Technical University) "Methods of Monitoring Microprocessors," Reiner W. Hartenstein (Kaiserslautern University, FRG): "Planning the LSI Chip from Development to Revolution;" Harold W. Lawson Jr. (Linkoping University, Sweden): "System Development with LSI and VLSI Elements;" B. N. Naumov, academician, chief design engineer (USSR): "Efficient Use of Microprocessors in Problem-Oriented Computer Technology Complexes;" Herman Schmid (General Electric, USA): "Problems of Standardizing Microprocessors;" Branko Soucek (Zagrab University, Department of Mathematics): "Gigantic Information Systems of the 80's Based on Mini-and Microcomputer Systems."

For further information write or phone:

HTE Titkarsag
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Kossuth Lajos ter 6-8
1055
Tel. 113-027

CSO: 2502

HUNGARY

SYSTEM DESIGNED FOR USE OF MICROPROCESSORS

Budapest MERES ES AUTOMATIKA in Hungarian No 6, 1979 p 228

[Article by G. Horvath, G. Racz, Dr E. Selenyi, J. Sztipanovits: "Application System of Microprocessors-the MMT System"]

[Summary] On the basis of experience gained during the design of several microprocessor systems, the MMT [Muszer es Merestechnikai Tanszek, Department of Measurement and Instrument Engineering] microprocessor application system was evolved at the Department of Measurement and Instrument Engineering of Budapest Technical University. The main objective is to provide those enterprises which do not have computer technology as their main line with a complete system. This system enables them to concentrate their resources on the solution of problems in a given special field and omit the stages of ground-level development. The MMT system includes all hardware and software elements necessary for the development, manufacture and maintenance of various microprocessor-controlled systems and instruments. The article describes the MMT system.

CSO: 2502

AUTOMATION OF ELECTRON BEAM EVAPORATION

Budapest FINOMMECHANIKA-MIKROTECHNIKA in Hungarian No 6, 1979 p 193

[Article by A. Hargittai, Communications Engineering Research Institute, A. Lovics, Automat Work of Mechanical Measuring Instruments Works: "Automation of Electron Beam Evaporation Systems by Ion Current Ratemeters"]

[Summary] By measuring the current of positive charged particles (ions) resulting from electron-beam evaporation, it is possible to measure the deposition rate and the thickness of thin films. The authors describe the automatic ratemeter system based on ion current measurement. The phenomena and results of an experimental operation of electron-beam evaporation system supplied with a ratemeter of this kind is described also. An already realized programmed control is introduced, and the preliminary draft of a microprocessor system controlling several evaporation systems at the same time is presented.

CSO: 2502

HUNGARY

POWDER CORE WELDING ELECTRODES

Budapest KOHASZAT in Hungarian No 4, 1979 p 142

[Article by A. Bodor, M. Ungvarszky, and G. Szegedi: "Powder Core Welding Electrodes Developed at Research Institute for Ferrous Metallurgy"]

[Summary] The Research Institute for Ferrous Metallurgy [Vasipari Kutato Intezet] has been working on powder core welding electrodes for as long as 10 years. As a result of research and development, several types of electrodes have been produced for successful practical applications. The paper discusses the main characteristics of the various types and the recommended mode of welding. The economic aspects of the use of powder core electrodes are also mentioned.

CSO: 2502

INTERKOSMOS-19 IONOSPHERE PROBE, EQUIPMENT DESCRIBED

Warsaw SKRZYDLATA POLSKA in Polish No 15, 15 Apr 79 pp 5-6

[Article by Pawel Elsztein: "Poland in Space, Interkosmos-19"]

[Text] Two weeks ago I discussed our latest satellite experiment on the Interkosmos-19 AUOS Ionozond satellite with the scientific director of the Polish team, Dr Zbigniew Klos of the Polish Academy of Sciences [PAN] Institute for Space Research [IBK]. Wishing to add to this information, I turned to Magister Eng Slawomir Aleszkiewicz of the Aviation Institute [IL], who is the technical director for the Polish team. This aspect is important for our science and experiment technology.

The engineer was found in one of the laboratories of IL's Avionics and Satellite Equipment Department, and with the accommodating agreement of the department's manager, Magister Eng Grzegorz Parfianowicz, all doors were opened to me, leading to uncovering the secrets of the equipment being built here.

I began with the basic question: What is the role of the technical director in preparing an experiment? Engineer Aleszkiewicz explains in detail on what the work of a technical director is based. He was involved with the experiment from the very beginning. He is responsible for preparing the equipment, for its proper testing as well as for its proper operation with other equipment since our equipment in the satellite does not operate independently, but in conjunction with other equipment. Here the engineer mentioned the Soviet AWC-2 high frequency analyzer, which was built by specialists from IZMIRAN, a scientific institute of the Soviet Academy of Sciences. This analyzer relays selected signals from the satellite in the 0.1 to 5 MHz band. Our equipment has input circuits that are shared by this analyzer. An antenna, two antenna preamplifiers, an input amplifier and a bandpass filter are also shared. In addition a so-called auxiliary system is also shared. But enough of this; the concern here was only about an example of joint operation and dependence between individual equipment components.

Here there is no room for the smallest inaccuracy or incompatibility. All equipment located within an Interkosmos series satellite is subject to extensive initial testing at the Space Research Center [CBK] in Moscow. This does not include tests performed in our own IL because this would take up a considerable number of pages of this issue. Ther interaction of individual equipment components and their joint operation are checked at the IBK. Specialists from countries participating in the experiment assist in this work. After the first-stage tests, the technological object is verified (three samples of each piece of equipment built are delivered to the coordinating center). The equipment is connected to an earthbound cable network which simulates the network installed on the satellite. After the telemetry system is connected, that is, the so-called service system, the operation of the individual devices, their interaction and interferences are checked out. After this initial testing, so to say, the center from which the research satellites are launched takes over control.

Further tests are conducted at the launch center. All the time, however, is spent on the so-called technological object. During this entire time the project technical director must be present, verifying with his signature the completion of successive tests. But why are three equipment samples needed when it is known that only one will be launched into space? The explanation is that the one to be launched is not "tortured" with testing. In case some kind of defect is discovered, it is easy to correct on the technological sample because the designs and systems are identical.

When I asked what kind of defects can be discovered literally 5 minutes before the proverbial bell, the engineer explained that defective network connections and improper interaction between equipment can be detected. But we have a very reliable equipment operation program. Equipment test points exist that permit rapid localization of defects, and it should be remembered, said the engineer, that we are not only the users of all the equipment but also its designers; thus, there is less likelihood of some kind of error. I was interested to know if repairs could be made in place prior to launch. Of course, such a capability exists at each stage of prelaunch testing. It also should be remembered that highly experienced Soviet specialists monitor the entire project, the preparation of the entire interior of the satellite, which is considerable. Mistakes are highly unlikely here.

I know that there were no mistakes, but did everything operate properly in our equipment? The engineer recalled that there were minor problems with the relay, but they were quickly resolved. He added that a similar type relay by the same manufacturer operated very well during a previous experiment, that is, it had been tested in space. The engineer assured me that such incidences are very rare.

Let us now return to the tests. The experiments and tests are repeated. The last stage of the testing occurs when the satellite is sealed, and the equipment rests in a compartment filled with an inert gas. Now the operation of all the electromagnetic-wave-radiating systems is verified to the extent that the external systems, for example, the antennas, can be utilized. This is not always possible because antennas often are about 50 m long and are designed for one-time use under ideal conditions--in space. The antennas are unreeled like a steel rule from a reel. Engineer Aleszkiewicz reminded me of the principle of not "overworking" the equipment with constant testing as is required in space technology.

Here is an interesting detail. I learned that we have the capability of testing our equipment even when it is sealed in the satellite. Thus, if a need exists to make a final check on the ground of a given equipment, special links are connected to the satellite and a number of essential measurements are obtained using a portable measuring device. I should add that the measuring device is built into a carrying case, a so-called briefcase, and is the most original measuring equipment for this type of test equipment used in satellite technology service. I would wager that one would not be able to tell the real purpose of this carrying case carried by a designer. It is also worthwhile mentioning that from the moment the equipment is sealed in a satellite, it is only possible to receive data via telemetry. But the telemetry relay does not include all the test parameters, for example, currents and voltages. The total weight of the scientific equipment is about 150 kg. The Interkosmos satellites are serial designs capable of interchanging certain subassemblies depending on current need.

This is all good and well, but our equipment was not the only apparatus on the Interkosmos-19 satellite. The full listing of the 11 devices is as follows:

1. I-338 ionosphere probe--to investigate electron concentration distribution in the upper atmosphere, Soviet Academy of Sciences IZMIR; Soviet Academy of Sciences IBK;

2. ANC-2ME low frequency analyzer--to measure the spectrum of low frequency electromagnetic fields in the upper atmosphere, the USSR;

3. KM-3 probe to measure electron temperatures--to investigate the distribution and characteristics of plasma electron temperatures along the satellite's path, Soviet Academy of Sciences IBK; Czechoslovak Academy of Sciences IGF;

4. P-4 sounding device--to measure the concentration of electrons and ions as well as temperatures in the upper atmosphere, the USSR;

5. M4K-3 "Majak" coherent radio transmitter--to investigate the ionosphere by the radio wave propagation method, Czechoslovakia;

6. SF-3 electron spectrometer--to measure the energy spectrum and angular distribution of low-energy electrons, the USSR;

7. EMO-1 optical electrophotometer--to measure upper atmosphere optical emissions in the 5,199 to 5,201 and 6,300 to 6,364 Angstrom bands and the 3,914 and 5,577 Angstrom lines, Bulgaria;

8. Pero-ZI cosmic radiation counter--to measure the flux of charged particles and their distribution in the magnetosphere, Moscow University;

9. IRS-1 radiospectrometer--to measure the spectral power densities of natural and stimulated resonances of ion plasmas, PAN CBK; IL Poland;

10. AWC-2 high frequency analyzer--to investigate the interaction of longitudinal electromagnetic waves and resonances in an ionospheric plasma, the USSR;

11. ETMS telemetry system--to record and transmit to Earth scientific data, Soviet Academy of Sciences IBK; Institute of Geophysics [IGF] of the Czechoslovak Academy of Sciences; Institute for Electronics of the GDR Academy of Sciences; Bulgarian Academy of Sciences, IL Poland; and Budapest Polytechnic, Hungary.

As can be seen from the list, two Polish devices are located on the satellite. Two antenna preamplifiers, which were built at the IL and which are located within the satellite and operate in open outer space, should be added to the list. They were very carefully constructed and are capable of operating in temperatures from -40 to +50 degrees C. They were insulated with a special cloth to protect them from overheating, cold and harmful radiation.

I then asked Engineer Aleszkiewicz about the operation of our equipment. We know that the satellite followed its planned orbit with great accuracy. We know that all the antennas, sensors and solar panels opened up properly. All systems are operating normally. The operation of the telemetry system was verified. Our unit generated no interference and the equipment connects and disconnects according to the program.

We are constantly kept informed about the operation of the apparatus. What happens at launch? Six minutes after launch we already know what is happening, what the situation is like in the air. After 1.5 hours the carrier with the satellite vanishes beyond the horizon. After 3 hours we receive the first transmission concerning deployment of the

external systems. After 3 days we know how our apparatus is operating. The first connection of the telemetry system occurs later on. After the satellite becomes stabilized in its orbit, the systems associated with its motion in orbit are checked out. It is only later on that the scientific and research equipment are checked out. The normal transmission of data now begins. It is expected that the scientific apparatus will operate for about 6 months. But even with this, the technician's job is not over.

All scientific data are sent to the IBK in Moscow, from whence they are sent to our PAN CBK for processing. An explanation is necessary here: we do not receive information directly from the satellite. We still do not have an earth telemetry station. Bulgaria and Czechoslovakia, however, have such stations. If such a need arises--and undoubtedly that will occur as space research intensifies--then we will be able to build such a station.

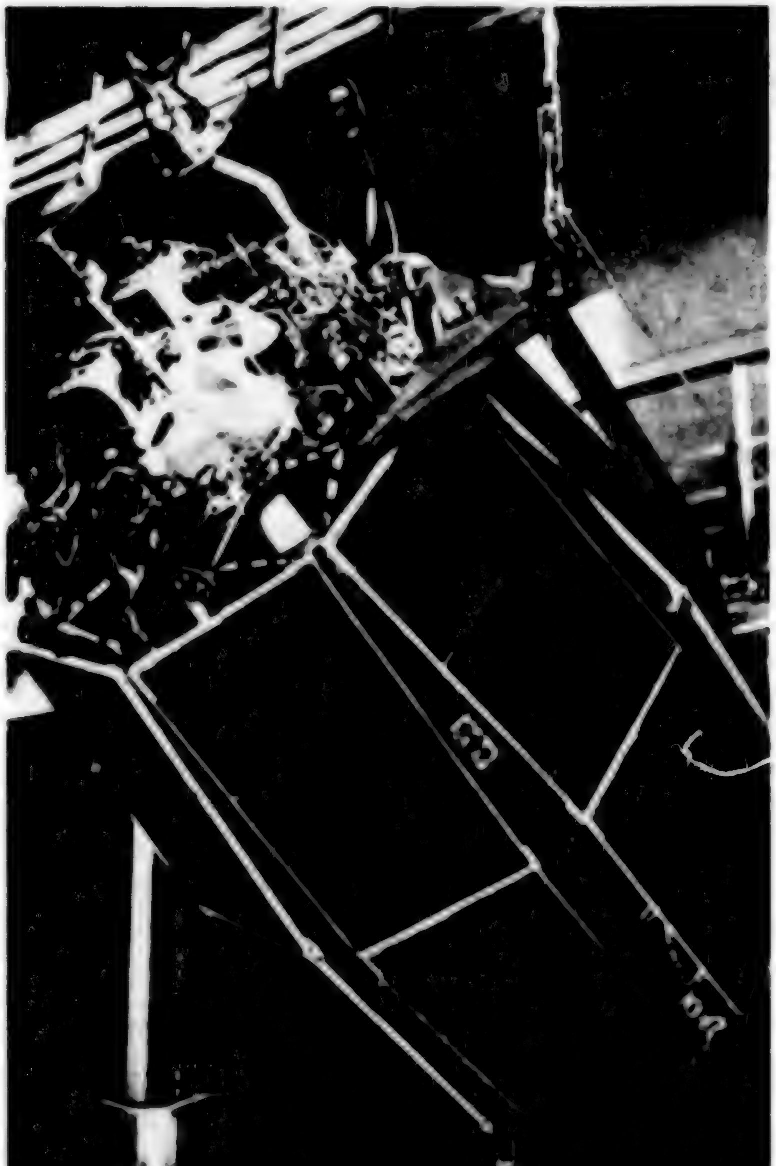
I tormented the engineer with additional questions. For example, I wanted to know if our IRS-1 equipment is comparable to the best radio receiver, such as Hi-Fi. The engineer is distressed because he is unable to compare the equipment I mentioned with a spectrum analyzer. He talks only about useful sensitivity. The IRS-1 has a sensitivity of about 1 microvolt and is self-calibrated; this permits the input voltage levels to be determined and the frequency range to be gauged. Simply put, the equipment itself generates standard signals, and the scientific data can be evaluated according to these standards.

What else does the IRS-1 have? Its total weight is about 3 kg. The power from the onboard network is 8 W. It has its own memory, an extensive feeder system with protection against short circuits and external and internal interference. The equipment operates automatically.

Engineer Aleskiewicz explains to me all intricacies of the block diagram which I show in the Fig 1 diagram. The IRS-1 is the work of a team. But Dr Eng Jan Kazmierski is the creator of the receiving-measuring circuitry. Magister Eng Stanislaw Wasko and Dr Eng Narkis Muchamediarow participated in this work. Dr Eng Zygmunt Krawczyk designed the tuning system and the first heterodyne. Magister Eng Witold Kaleta designed the control system and Magister Eng Zbigniew Sikorski the power system. Magister Eng Kryzsztof Nowak designed all the mechanical subassemblies, and Slawomir Aleszkiewicz designed the ground diagnostic equipment, control and monitoring equipment. Have I named everyone? Probably so, but I must add that S. Aleszkiewicz, K. Nowak and Magister Arkadiusz Kiraga (CBK PAN) were present during the tests in the USSR and at the launch of the rocket with the Interkosmos-19 satellite. Magister Eng Stanislaw Rojszyk, S. Aleszkiewicz and K. Nowak developed the channel oscillators that are part of the ETMS system.

Photo 1.
Magister Eng Slawomir Aleszkiewicz

Photo 2.
The Interkosmos-19 satellite AUOS Ionozond prior to installation in carrier rocket.



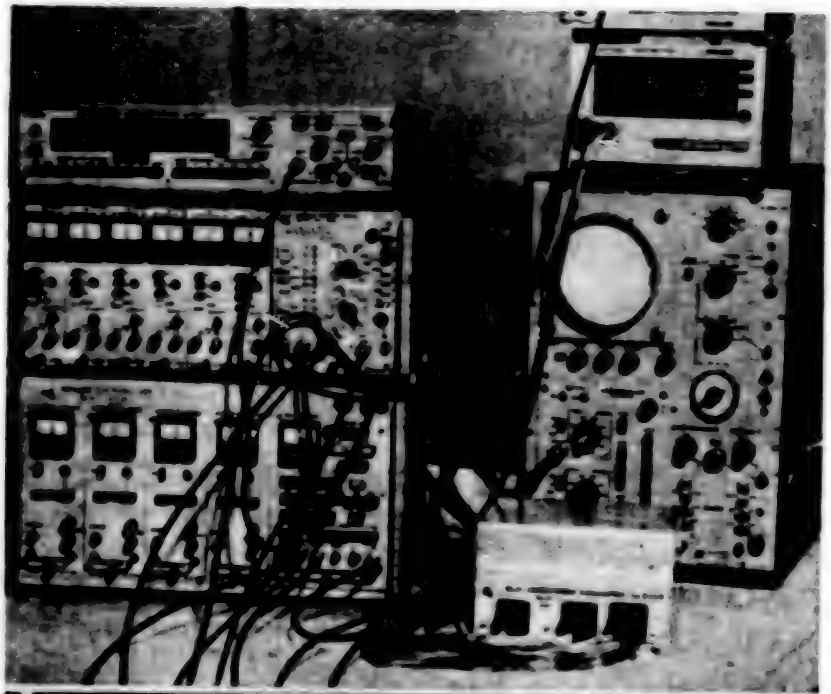


Photo 3.
Channel oscillator unit of the telemetry system on a measuring stand at IL.

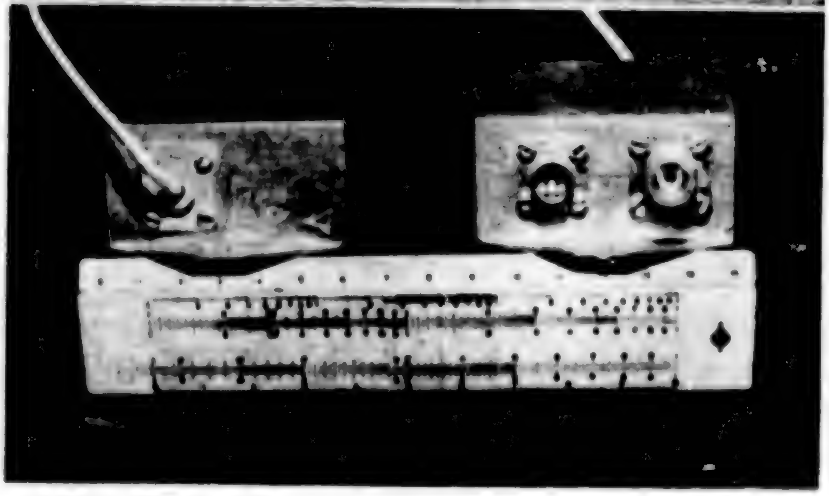


Photo 4.
Radiospectrometer preamplifiers built at the IL which are located on the satellite exterior.

Photo 5.
The IRS-1 monitoring and control system.

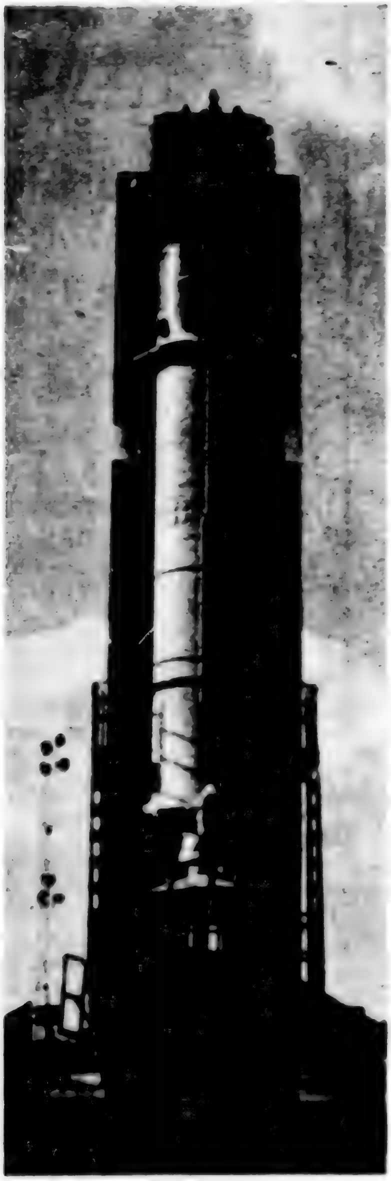


Photo 6. A unit of the carrier rocket.

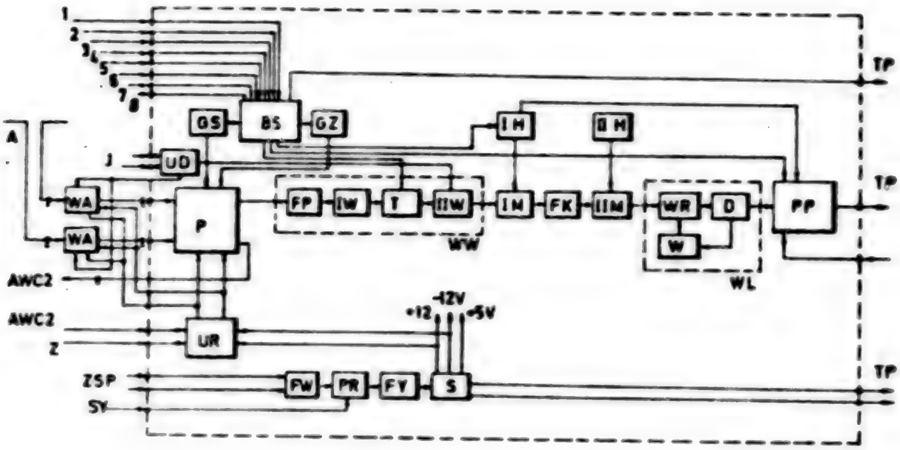


Figure 1. Block diagram of the IRS-1 radiospectrometer

Key:

1. Direct transmission telemetry system
2. Memory
3. Time signal (2 s)
4. Time signal (16 s)
5. Time signal (32 s)
6. Gain variation command
7. Connect memory command
8. Tuning command (10 s)

A Dipole antenna
WA APIRS-1 Antenna amplifier
J I-338 Ionozond
UD Matching system
GS Noise generator
BS Control unit
GZ Frequency marker generator
IH First heterodyne and tuning system
IIH Second heterodyne with quartz stabilization
TP Onboard telemetry
P Preamplifier
FP Bandpass filter
IW First input stage
T Suppressor (20 dB)
IIW Second input stage
IM First mixer
FK Quartz filter
IIM Second mixer
WR Regulated amplifier
D Square law detector
PP Intermediate memory
W ARW amplifier
WW Input amplifier
WL Logarithmic amplifier
Z Power from the onboard network
SY Synchronizer (2200Hz)
UR Distribution system
FW Input filters
PR Converter
FY Output filters
S Stabilizer

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CSO: 2602

CONSTRUCTION INDUSTRY COMPUTER DISTRIBUTION

Warsaw INFORMATYKA in Polish No 5, May 79 p 22]

[Text] The principle of unconstrained development is being applied: the forming of a center and its advancement to the level of an establishment; and the advancement of an establishment to the level of an enterprise. The list of construction industry electronic computer offices and their computer equipment are provided in the table. The table does not include outside organizational units, such as data preparation stations or design teams. The current scope of computerized information services of the construction industry electronic computer network includes approximately 750 enterprises of the construction industry (and building materials industry) inside and outside of the construction ministry, about 40 central offices of the associations (but at a still unsatisfactory level), most departments of the Ministry of Construction and Building Materials Industry and most ministrial design offices (with increasing use of automatic drafting).

(1) Przedsiębiorstwo	(2) Zaklad Obliczeniowy (ZO) Zaklad Obliczeniowy (OO)	(3) Komputer
Bydgoszcz	Koszalin (ZO)	2 × ODRA 1305 ODRA 1304
Gdańsk	Olsztyn (ZO)	ODRA 1305 ODRA 1304
Katowice	Bielsko Biala (OO)	3 × MIŃSK 32 RIAD ODRA 1305
Kraków	Kielce (ZO)	2 × MIŃSK 32 ODRA 1305 RIAD 32 ODRA 1305
Łódź		3 × MIŃSK 32 2 × ODRA 1305
Poznań	Zielona Gora (OO)	2 × ODRA 1305 ODRA 1305
Rzeszów		ODRA 1305 ODRA 1304
Warszawa	Bialystok (ZO) Lublin (OO)	MIŃSK 32 ODRA 1304 2 × ODRA 1305 ODRA 1305 ODRA 1305
(4) Centrum	Wrocław (ZO)	2 × ODRA 1305

Key:

1. Enterprise
2. Computer establishment (ZO)
   Computer center (OO)
3. Computer
4. Central office

CSO: 2602

DATA ON PATENTS, TECHNICAL INNOVATIONS, 1970-1977

Belgrade SOCIJALIZAM in Serbo-Croatian No 4, Apr 79 pp 74-77

[Excerpt from unsigned article]

[Excerpt] Relative Proportions, Number and Sources of Innovations (Inventions, Technical Improvements and Useful Suggestions) in Yugoslavia

We still do not have a complete system of recordkeeping and statistics on the fate and application of registered innovations. As a consequence it is not possible in the country as a whole to ascertain the status, number and proportions of innovations by origin and originators, nor especially the economic and other benefits achieved by their application.

That is why the figures given for the country as a whole represent in each case a rough approximation and do not reflect the true situation in this field. However, this does not mean that these figures cannot be indicative, nor that they do not point up the basic problems and directions of future activity in stimulating innovation.

1. Patent applications in Yugoslavia in the period between 1970 and 1977 varied as follows on the basis of source:*

	1970	%	1971	%	1972	%	1975	%	1976	%	1977	%
Organizations of associated labor	140	16	167	18	154	18	132	11	162	13	175	15
Institutes	35	4	31	3	37	4	56	4	45	3	31	2
Individuals	708	80	724	79	670	78	1,063	85	1,132	84	987	83
Total	883		922		861		1,251		1,339		1,193	

* Source: "Analiza stanja inventivne djelatnosti izumiteljstva i tehnickih inovacija u SR Hrvatskoj ..." [Analysis of the State of Inventive Activity, Invention and Technical Innovations in Croatia ...], Assembly of the Socialist Republic of Croatia, Zagreb, 1977.

The figures in the table show that in Yugoslavia there still has been no decisive turning point with respect to a constant and faster growth in the number of patent applications. Whereas in 1976, for example, 1,339 patents were applied for in Yugoslavia, in 1977 there was a substantial drop in the number of patent applications.

Nor on the other hand has there been any radical change in direction with respect to sources of patent applications. That is, the share of individuals is still predominant in the breakdown of patent applications, varying between 79 and 85 percent of all applications, which means that organizations of associated labor have not been increasing their share. We should also point to the fact that in all the industrially advanced countries the share of organizations in the economy is predominant in total patent applications and technical innovations. In some countries (in Switzerland, for example) this share goes as high as 90 percent, while in other countries it ranges between 60 and 90 percent. A more favorable share in the breakdown of registered inventions in Yugoslavia have been recorded in Slovenia, where organizations of associated labor have a share of 60 percent in this total (in 1977). Similar but less pronounced tendencies in the direction of a larger share of organizations of associated labor are also evident in Croatia, Serbia, Bosnia-Hercegovina, and so on.

However, the figures in the table also indicate another very important factor. That is, it is obvious that the number of patent applications was not undergoing any essential change in the 1970-1973 period; indeed the figure for 1972 was smaller than for 1970. But even by 1975 and 1976--in the years of technical innovations and an organized public drive, then--the number of innovations and inventions for which patent applications had been filed was increasing considerably. This fact is not diminished even by the fact that there are no figures for 1973 and 1974, since in those years the situation was not essentially more favorable than in the previous 3 years.

Moreover, it follows from the table that in the years of technological innovations there was an essential increase in the share of individuals in total patent applications, which confirms still more that this result is the fruit of the organized public campaign and the more favorable social climate created for the inventive creativity of the working people. Thanks to this organized public action, there has been a decrease in the share of foreign patent applications in total patent applications in Yugoslavia; in 1970 there were 2,334 foreign patent applications, and in 1976 that number dropped to 1,865.

In the Yugoslav economy 145 patents were applied for in the 1971-1975 period, and the total economic benefits of their application are estimated at 177,769,000 dinars.

For the sake of comparison, but also in order to examine how important it is to have an organized, systematic, persistent and finely adjusted effort to achieve a greater scale of inventive activity in Yugoslav organizations of

associated labor, we should also emphasize that in all the advanced countries the lower limit is taken at 300 patents obtained per million inhabitants per year. The leaders in this respect are as follows: Switzerland (1,000 per million), and then Japan (700), Czechoslovakia and the USSR (450 apiece), West Germany (400), Greece and Poland (150 apiece), and Romania and Spain (120 apiece). In 1976 Yugoslavia had only 66 patent applications per million inhabitants.

Finally, to illustrate flows in the transfer of technology from other countries into our own country and in the opposite direction we cite the figures that between 1973 and mid-1975 organizations of associated labor purchased (by contract) 316 licenses (and know-how), as follows: 183 from the Common Market countries, 58 from EFTA countries, 20 from CEMA countries, and 55 from other countries. On the other hand, in that same period our country sold only eight licenses, four of them originating in Serbia, three in Slovenia and one in Croatia.

2. The figures in a survey conducted by the Federal Bureau of Statistics (in 1976) on the status of technical improvements and proposals in Yugoslavia show that the trend in the number of registered technical improvements has been as follows: in 1971 626 technical improvements were registered, 634 in 1972, 790 in 1973, 959 in 1974 and 1,303 in 1975.

These figures confirm still more clearly the statement made in commenting on the table concerning patent applications. It is evident from the figures that in the country as a whole the trend of applications to patent technical improvements was relatively mild up to 1975 as compared to 1975 itself (that is, the year of technical innovations). In 1975 the number of technical improvements increased 60 percent over the previous year. The largest percentual increase was recorded in Serbia, which was followed by Bosnia-Hercegovina and Slovenia, the latter accounting for nearly 60 percent of technical improvements for which patents were applied for in Yugoslavia (in 1975).

It is significant that in the breakdown of originators of technical improvements with respect to level of specialized education (for the 1971-1975 period), according to that same survey of the Federal Bureau of Statistics, first place is taken by highly skilled workers (856), who are followed by originators with secondary technical training (802), and skilled workers (544), workers with senior postsecondary specialized education (472), workers with junior postsecondary specialized education (289), workers with elementary technical education (144), semiskilled workers (74) and unskilled workers (22). The ranking is similar from republic to republic except that in Slovenia first place is taken by workers with secondary specialized education and second place by highly skilled workers.

In the 1971-1975 period a total of 3,050 technical improvements were applied, and the total economic benefit is estimated at about 1,023,369,000 dinars (according to the same survey of the Federal Bureau of Statistics).

3. The status and dynamics of useful proposals registered in the 1971-1975 period are similar to the status and dynamics of patents and technical improvements registered in that same period. This is shown by the following figures: there were 742 useful proposals registered in 1971, 604 in 1972, 744 in 1973, 785 in 1974 and 1,093 in 1975.

It is evident from the figures that in the country as a whole a substantial advance has been achieved in the very year of technical innovations (1975). The increase in the number of proposals registered was 44 between 1973 and 1974, and it was 308 between 1974 and 1975, which is an eightfold increase over 1973. The dynamics in registration of useful proposals has been similar from republic to republic, but the changes have been more extensive in Serbia (30 were registered in 1974 and 74 useful proposals were registered in 1975). The largest number of useful proposals were registered in 1975 in Slovenia (763), which represents 61 percent of all proposals registered in Yugoslavia.

The breakdown of originators of useful proposals with respect to the level of technical education is almost identical to the breakdown of originators of technical improvements. In Yugoslavia (in the 1971-1975 period) highly skilled workers (797) were in first place, and they were followed by workers with secondary technical education (742), skilled workers (612), workers with senior postsecondary technical education (349), workers with junior postsecondary education (260), semiskilled workers (115), workers with elementary education (79), and unskilled workers (45).

With respect to the breakdown of originators of useful proposals registered (just as in the case of technical improvements) in Slovenia workers with secondary technical education are in first place (589 of the total 2,065 proposals in that republic in the period under review). We should emphasize that in Croatia first place in this regard does not go to highly skilled workers, but to workers with senior postsecondary technical education. (In that same period highly skilled workers were originators of 137 proposals and workers with senior postsecondary technical education 154.)

On the basis of the survey of the Federal Bureau of Statistics, it has been estimated that the total financial benefit of the 2,259 useful proposals applied (in the 1971-1975 period) was 613,169,000 dinars.

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